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(56) Documents Cited
GB 1319539 A GB 1316279 A US 3629756 A

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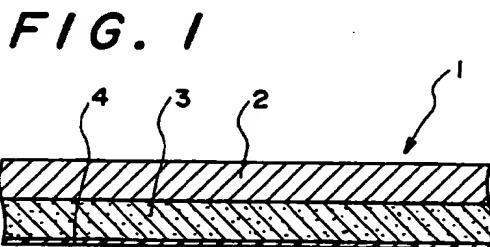
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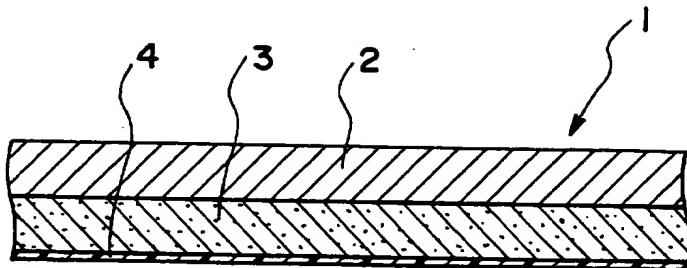
57-60 Lincoln's Inn Fields, LONDON, WC2A 3LS,
United Kingdom

(54) Magnet sheet for display

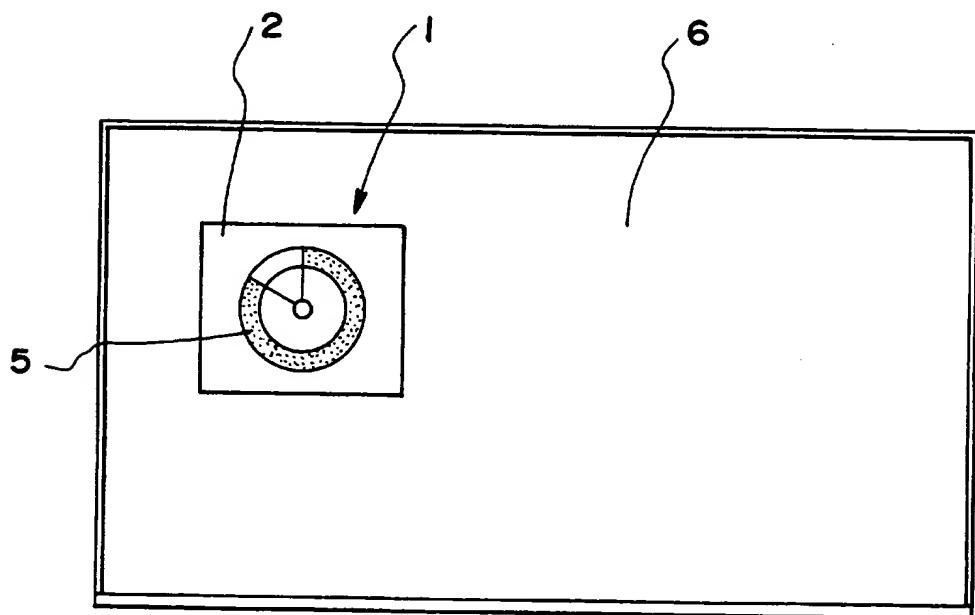
(57) A magnetic sheet arrangement 1 comprises a magnetic sheet 3 formed by magnetic particles moulded in a synthetic resin. The magnetic sheet 3 includes a surface with a multiple of alternate North and South magnetic poles. The other surface of the magnetic sheet is bonded to a sheet of material 2 suitable for receiving print. The magnetic sheet arrangement 1 is provided in a manner which may be printed on using a printer or copier or like device. The magnetic sheet 3 and the sheet of material 2 for receiving print may have a thickness of 0.05 - 0.15 mm and the magnetic sheet arrangement 1 may have a resulting thickness of 0.1 - 0.3 mm. A coating 4 may be applied to the magnetic surface to prevent contaminants sticking to the said surface or a sheet of material 2 for receiving print may be bonded to both surfaces of the magnetic sheet 3 to avoid the magnetic sheet arrangement 1 curling due to different temperature coefficients of the materials employed.



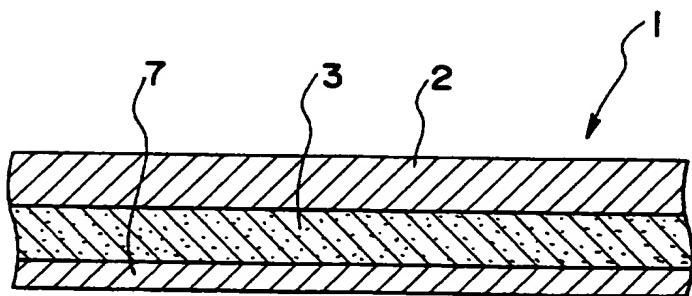
F I G . 1



F I G . 2



F I G . 3



MAGNET SHEET FOR DISPLAY**BACKGROUND OF THE INVENTION****1. FIELD OF THE INVENTION**

This invention relates to magnet sheets which can be directly magnetically attached to magnetic surfaces of steel boards, white boards, etc., and more particularly, to magnet sheets for display which are capable of printing print contents thereon using home or business office printers, such as copiers, laser printers, ink jet printers, bubble jet printers, ink ribbon type heat-sensitive printers, dot printers, plotters, etc.

2. PRIOR ART

A magnet sheet, which is made of a material obtained by adding magnetic particles to a synthetic resin material and has one surface with alternate N and S magnetic poles formed by multiple pole magnetization, is sheet -like and flexible and can be magnetically attached detachably to magnetic surfaces of steel boards, white boards, etc. Thus, it can find extensive applications as marks for car driving beginners, business displays, document binders, drawing boards, and notices to be attached to magnetic surfaces.

The marks for car driving beginners and business displays are produced in a method, in which a white vinyl chloride sheet or like display sheet is bonded with an adhesive or the like to a magnet sheet and a desired display is formed by silk printing or the like on the display sheet, or a method, in which a display is printed in advance on a display sheet and then the display sheet is bonded likewise to a magnet sheet. They can be conveniently attached to surfaces of magnetic members such as steel boards.

Although displays using magnet sheets as above can be conveniently magnetically attached to any magnetic surface, they are

expensive because each of them is prepared by the above method of bonding a white vinyl chloride sheet or like display sheet on a magnet sheet and printing a desired display content thereon by silk printing which requires a printing plate for each color or preliminarily printing a display content on a display sheet using a printer and bonding this display sheet to a magnet sheet. Besides, the kind and form of the display are inevitably limited. Therefore, it is inevitable for general home or offices to purchase magnet sheets for display, with impressions of display contents, from specialized shops, or displays have to be given up when magnetic sheets with desired display contents are not available.

SUMMARY OF THE INVENTION

In the above circumstances, there has been a demand for a magnet sheet for display, which permits general home or offices to readily and quickly form a desired display content on it and then magnetically attach it to a desired place without need of purchasing any existing magnetic sheet available for display.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a sectional view showing a first embodiment of the magnet sheet for display according to the invention;

Fig. 2 is a view for describing how a magnet sheet for display according to the invention is used; and

Fig. 3 is a sectional view showing a second embodiment of the magnet sheet for display according to the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 shows a first embodiment of the magnet sheet for display.

according to the invention. Referring to the figure, reference numeral 1 designates a magnetic sheet for display. Reference numeral 2 designates a printing sheet consisting of a paper sheet, such as a high quality paper sheet or a coated paper sheet, or a synthetic paper sheet or a synthetic resin film and having a thickness of 0.05 to 0.15 mm. Reference numeral 3 designates a magnet sheet, which is made sheet -like of a material obtained by adding magnetic particles to a synthetic resin material and has at least one surface with alternate N and S poles formed by multiple pole magnetization. Reference numeral 4 designates an anti -transfer coating of a fluorine type material or the like formed on the magnetized surface of the magnet sheet 3.

The printing sheet 2 is suitably selected by taking the printing means used, purpose of use, cost, etc. into considerations, and it may be a sheet of cellulose fibers, an art paper sheet or a coated paper sheet obtained from the cellulose fiber sheet by coating a surface treatment material thereon, a synthetic paper sheet which is a thin synthetic resin film obtained from a synthetic resin material by adding white earth thereto or forming micropores therein, a synthetic resin film, etc. A high quality paper sheet is suitably used for printing with a copier, and a coated paper sheet or an art paper sheet is suitably used for printing an ink jet printer, a bubble jet printer, etc.

When the thickness of the printing sheet 2 is excessive, printing with a printer cannot be obtained. When the printing sheet 2 has an insufficient thickness, on the other hand, the color (i.e., black color) of the back side magnet sheet 3 will be seen through it. For these reasons, the printing sheet 2 suitably has a thickness of 0.05 to 0.15 mm, preferably about 0.1 mm.

The magnet sheet 3 is formed by extrusion molding a synthetic resin material containing magnetic particles into a sheet. It has N and S poles formed on one surface by multiple pole magnetization and alternately

arranged at a constant pitch of 2 to 3 mm. When the thickness of the magnet sheet 3 is excessive, printing with a home or office printer cannot be obtained. When the thickness is insufficient, on the other hand, it is difficult to maintain sufficient magnetic attraction force and intensity. For these reasons, the magnet sheet 3 suitably has a thickness of 0.05 to 0.15 mm, suitably 0.1 mm. This thickness corresponds to a fraction of the thickness and weight of commercially available magnet sheets.

The printing sheet 2 and the non-magnetized surface of the magnet sheet 3 are bonded together using an acryle urethane type or like adhesive. The thickness of the adhesive layer is very small compared to the overall thickness of the magnet sheet for display, and is substantially ignorable. Under stringent conditions of its use such that it is held magnetically attached to a magnetic surface for long time or is heated in the magnetically attached state, the magnet sheet may be bonded to or contaminate the magnetic surface. Therefore, the anti-transfer coating 4 of a fluorine type or like material with a small coefficient of friction is provided to a thickness of several microns to the magnetized surface of the magnet sheet 3 for prevention thereof from being bonded to or contaminating the magnetic surface. A magnet sheet with a thickness of about 0.2 mm is thus completed, and it is cut to a suitable size and provided as a roll of sheet having a suitable length.

The thickness of 0.2 mm is substantially the same as the thickness of a thin name card, and thus the magnetic sheet 1 for display according to the invention is capable of reliably printing using a usual home or office copier or printer. With the thickness of the magnet sheet 1 for display set to about 0.2 mm, the magnet sheet 3 can be magnetized with a magnetizing force, which corresponds to ten times or above the weight of the magnet sheet 1 for display. Thus, even when the magnet sheet 1 for display is

magnetized perpendicularly to the magnetic surface, it can be reliably held magnetically attached thereto without possibility of spontaneous fall-down.

Fig. 2 shows how the magnet sheet 1 for display according to the invention is used. In this case, a display content 5, such as a graph, is printed on the printing sheet 2 of the sheet 1, and the sheet 1 is then magnetically attached to a magnetic surface 6 of a white board or the like. The magnetic surface 6 may be a white board, a partitioning member, a locker panel, a cabinet panel, etc., in a school, an office, etc.

The magnet sheet 1 for display may be used for company reports and photographs displayed on white boards or the like, teaching materials displayed on white boards or the like for school lessons or the like, materials utilized in conferences, or shop displays. Since the magnet sheet 1 for display is very thin, it can be readily cut like a paper sheet by using a scissors or a cutter into desired shapes.

Fig. 3 shows a second embodiment of the magnetic sheet for display according to the invention. Like the preceding first embodiment, this magnetic sheet 1 for display comprises a printing sheet 2 with a thickness of 0.05 to 0.15 mm and a magnet sheet 3 with a thickness of 0.05 to 0.15 mm, these sheets being bonded together. In this embodiment, however, no anti-transfer coating is provided on the magnetized surface of the magnet sheet 3. Instead, a printing sheet 7 of the same material as the printing sheet 2 and with a thickness of 0.05 to 0.1 mm, is laminated on the magnetized surface of the magnet sheet 3 such that the overall thickness of the magnetic sheet 1 for display has a thickness of 0.15 to 0.3 mm.

In the previous first embodiment of the magnetic sheet 1 for display, the printing sheet 2 and the magnet sheet 3 which are made of different materials, have different coefficients of expansion and elongation with changes in the temperature, relative humidity, etc. Therefore, when the

magnet sheet 1 for display is cut into small pieces, each cut piece may be warped or curled. In the second embodiment, the magnet sheet 3 is sandwiched between the two printing sheets of the same material, thus eliminating the elongation/contraction coefficient difference and hence the curling. Since the magnetized surface side printing sheet 7 in the second embodiment is not used for printing, it may be as thin as 0.05 mm so that the ground color of the magnet sheet can be seen through it.

Although not shown, it is possible to provide a double-side printable magnet sheet for display by multiple pole magnetizing both the surfaces of a magnet sheet 3 with a thickness of about 0.1 mm and bonding a printing sheet 2 about 0.1 mm thick to each magnetized surface of the magnet sheet.

As has been described in the foregoing, the magnet sheet for display according to the invention is manufactured by molding a material obtained by adding magnetic particles to a synthetic resin material into a sheet in the form of a thin film, forming one surface of the sheet with alternate N and S poles by multiple pole magnetization, thereby forming a magnet sheet, and bonding a printing sheet constituted by a paper sheet such as a high quality paper sheet or a coated paper sheet or a synthetic paper sheet or synthetic resin film to the other surface of the magnet sheet, and it permits quick and ready printing of a desired display content on it with a usual home or office printer or copier. The printed magnet sheet for display can be detachably magnetically attached to a magnetic surface of a steel board, a white board, etc. The magnet sheet for display thus permits ready preparation of displays having desired shapes, such as company reports or photographs to be displayed on white boards or the like, teaching materials to be provided on white boards or the like for school, lessons or the like, materials used for conferences, and shop displays.

A different magnet sheet for display according to the invention is manufactured by molding a material obtained by adding magnetic particles to a synthetic resin material into a sheet in the form of a thin film, forming at least one surface of the sheet with alternate N and S poles by multiple pole magnetization, thereby forming a magnet sheet, and bonding a printing sheet in the form of a thin film constituted by a paper sheet such as a high quality paper sheet or a coated paper sheet or a synthetic paper sheet or a synthetic resin film to each surface of the magnet sheet. Thus, while the magnet sheet for display permits printing on it with a usual home or office printer or copier and detachably magnetically attaching it to a magnetic surface, with the magnet sheet sandwiched between the two printing sheets of the same material it is possible to eliminate curling due to the elongation/contraction coefficient difference between the magnet sheet and the printing sheet.

CLAIMS:

1. A magnet sheet for display comprising a magnet sheet in the form of a thin film made of a material obtained by adding magnetic particles to a synthetic resin material, the magnet sheet having one surface with alternate N and S poles formed by multiple pole magnetization, and a printing sheet in the form of a thin film selected from the group consisting of a paper sheet such as a high quality paper sheet or a coated paper sheet, a synthetic paper sheet and a synthetic resin film, the printing sheet being bonded to the non-magnetized surface of the magnet sheet, the magnet sheet for printing being capable of printing with a printer, a copier or the like.
2. A magnet sheet for display comprising a magnet sheet in the form of a thin film made of a material obtained by adding magnetic particles to a synthetic resin material, the magnet sheet having at least one surface with alternate N and S poles formed by multiple pole magnetization, and two printing sheets each in the form of a thin film selected from the group consisting of a paper sheet such as a high quality paper sheet or a coated paper sheet, a synthetic paper sheet and a synthetic resin film, the printing sheets each being bonded to each surface of the magnet sheet, the magnet sheet for display being capable of printing with a printer, a copier or the like.
3. The magnet sheet for display according to one of claims 1 and 2, wherein the magnetic sheet has a thickness of 0.05 to 0.15 mm, and the printing sheet or sheets have or has a thickness of 0.05 to 0.15 mm.
4. The magnet sheet for display according to claim 1, which further comprises an anti-transfer coating formed on the magnetized surface

of the magnet sheet.

5. A magnetic display sheet comprising: a magnetic sheet for magnetically adhering to a display board; and a printing sheet bonded to the magnetic sheet; wherein the printing sheet comprises a paper sheet, a synthetic paper sheet or a synthetic resin film.

6. A magnetic display sheet substantially as described herein with reference to Figure 1 or to Figure 3.



The
Patent
Office

Application No: GB 9714577.5
Claims searched: 1 - 6

Examiner: J. A. Watt
Date of search: 23 September 1997

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): H1P (PGXC, PGZ); G5C (CBL)

Int Cl (Ed.6): H01F 7/02

Other: Online: WPI

Documents considered to be relevant:

| Category | Identity of document and relevant passage | Relevant to claims |
|----------|--|-----------------------|
| X, Y | GB 1319539 (S. A. KORES) see lines 34 - 46 and 71 - 80 of page 1 | X: 1 at least Y: 3 |
| X, Y | GB 1316279 (DORI BURKHOLTER) see whole document | X: 1 at least Y: 3 |
| Y | US 3629756 (HERMAN HOLTZ) see lines 20 - 45 of column 1 | 3 |

X Document indicating lack of novelty or inventive step
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& Member of the same patent family

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P Document published on or after the declared priority date but before the filing date of this invention.

E Patent document published on or after, but with priority date earlier than, the filing date of this application.

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